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the DILEMMA of declining defense dollars & increasing weapon systems costs

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By
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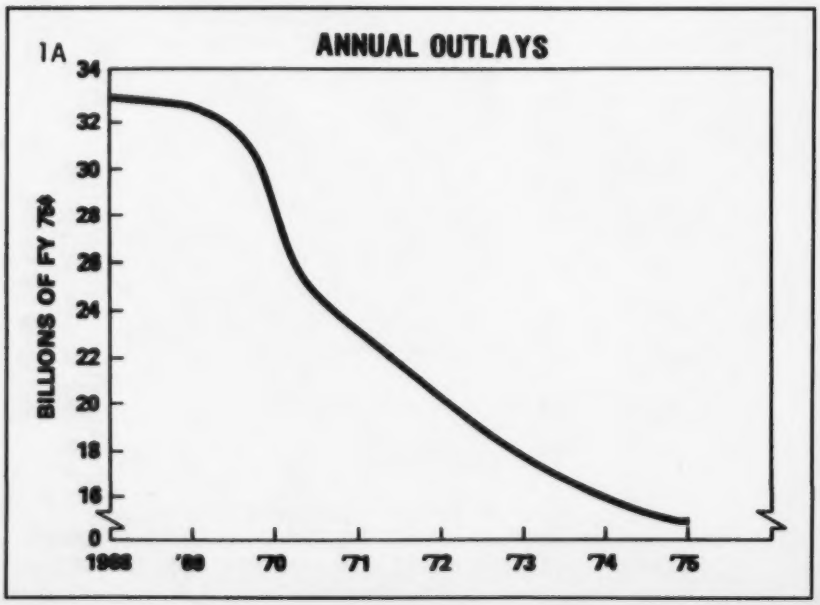
Deputy Assistant Secretary of Defense (Material Acquisition) (Installations and Logistics)

I welcome this opportunity to discuss the weapon systems acquisition aspects of the FY 1976 Defense budget estimates.

Let me begin by summarizing our procurement problem. In Chart 1A, you see the declining dollars being made available for procurement of new systems to replace and upgrade our current aging equipment. In Chart 1B, you see the rising unit cost of new systems required to keep up with the improved military performance of potential adversaries, In Chart 1C, you see the result of these two charts, a significant reduction in the numbers of systems which we can afford to buy. This results in both fewer systems available to our forces in the field and in a significant aging of the equipment with which our men must fight. Finally, in chart 1D, since military effectiveness can only be properly evaluated on a relative scale, we have shown the increasing quantities (to go along with the increasing quality) of the equipment being procured by the Soviet Union. Clearly, this picture is cause for concern.

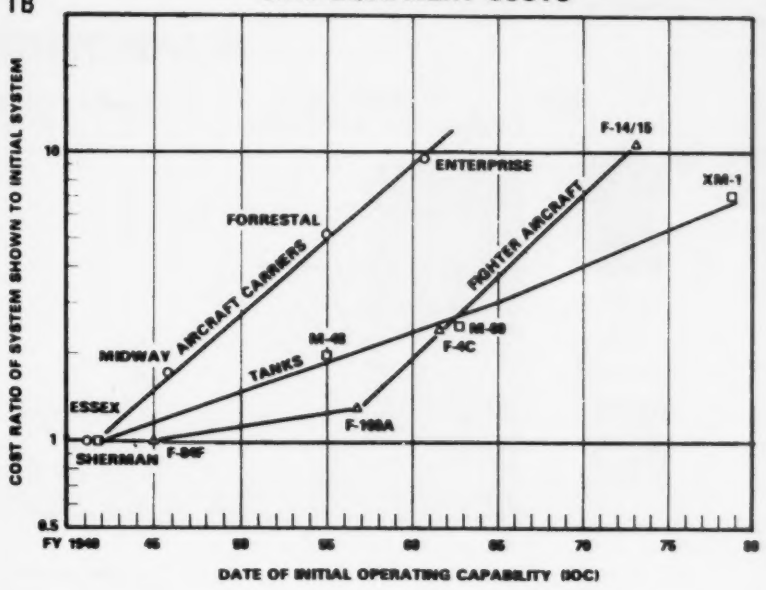
Two actions are required to correct these trends—first, increased



the trends

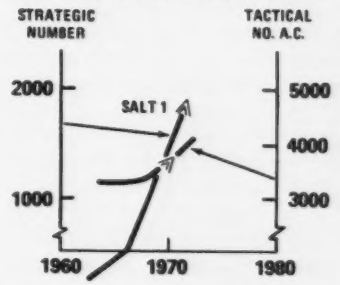
1B

UNIT EQUIPMENT COSTS



1D

QUANTITIES OF USSR EQUIPMENT



1C

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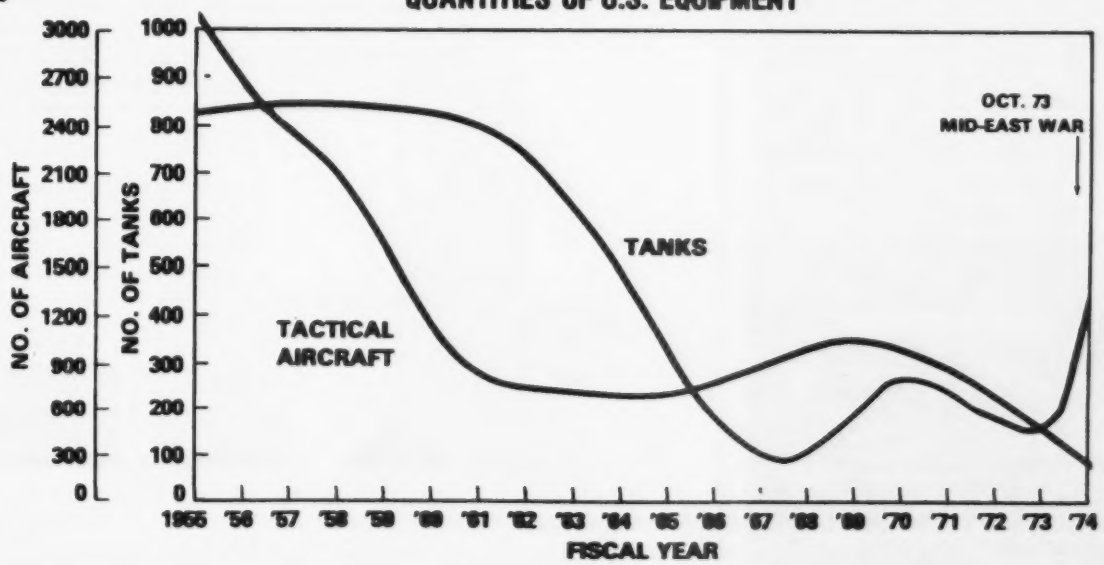


procurement funds must be provided (as requested in our FY 76 budget); and second, corrective management actions to attempt to reverse the trend of some of the "controllable" costs in the future.

Let me address myself primarily to this latter area; our budget submittal addresses the former area.

In Chart 2, you see the overall weapon system development cycle, beginning with research and ending with deployed systems. While the overall cycle represents more than 30 years, the crucial decisions are made in the 10-year period covered by the Defense Systems Acquisition Review Council (DSARC) process. "Requirements" and design are the two areas which primarily determine future production and support costs. To reduce the large expenditures for production and support costs, we must therefore attack these costs during the early phases of the design and development cycle. This is, in fact, the exact approach which we are taking.

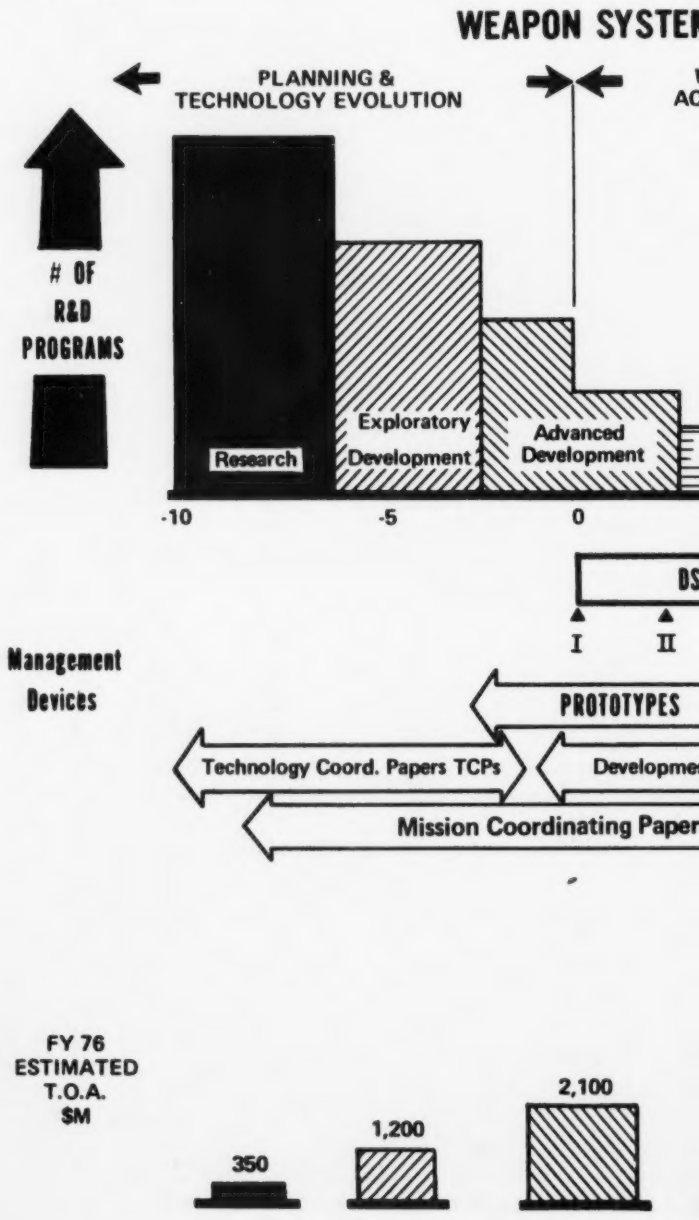
Chart 3 lists some of the major areas of emphasis initiated over the past few years. The first item on Chart 3 is **affordability.** If we project into the future the dollars likely to be available to support our defense needs, it is immediately clear that we cannot afford to have the quantities of high performance, high cost systems necessary for a high confidence defense posture. Thus, we are led in two directions—first, to the so-called "high-low" mix, whereby we will have a few high performance, high cost systems and a relatively larger

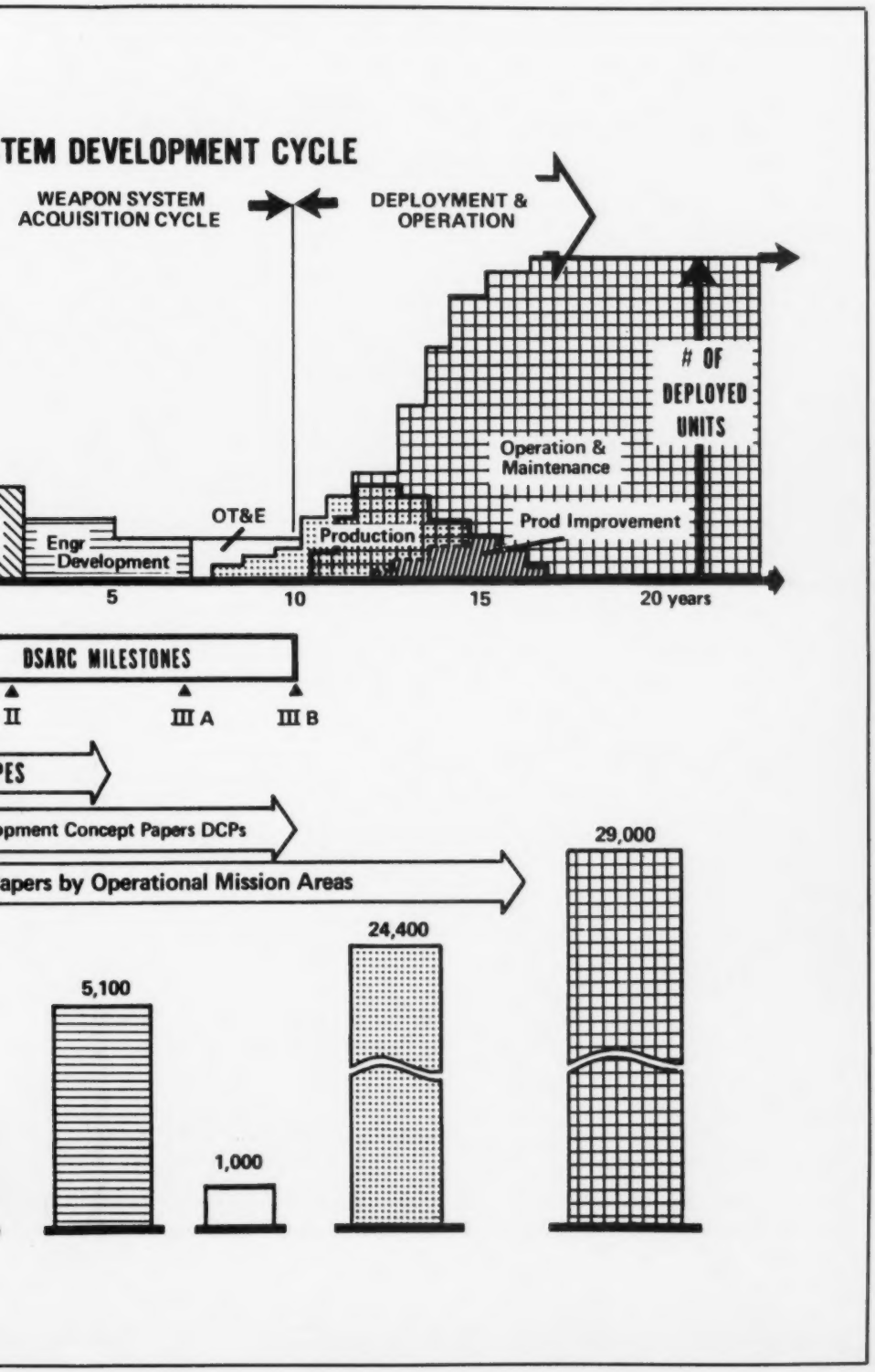
CHART 3

DoD ACTIONS

- *Affordability*
- *Design to Cost*
- *Reduced Support Costs*
- *Standardization*
- *Reduced Production Costs*
- *Industrial Base*
- *Improved Acquisition Management*

CHART 2





quantity of low cost, lower performance systems. This combination should provide an adequate defense posture for the dollars available, if we are able to achieve systems at both ends of the spectrum which satisfy the assumed unit cost and support cost with which we initiated their development. Secondly, we have a major "Design-to-Cost" goal, aimed to design our systems to these affordable costs.

Chart 4 shows the policy directive issued some time ago to initiate this "cultural change" in the way in which we do business. The major features of this directive are shown at the bottom of the chart. Our objective is to design to both unit production cost and to life cycle cost. Clearly, we cannot do this if we try for maximum performance capability in each weapons system. Thus, we *must* be able to trade performance, development schedule and development cost against reductions in production and support costs. It is this flexibility which should allow us to achieve the necessary unit costs and thus the quantities of equipment required for a credible defense.

CHART 4

DESIGN TO LIFE CYCLE COST

Quote from DoD Directive 5000.1, Subject: Acquisition of Major Defense Systems:

"Cost parameters shall be established which consider the cost of acquisition and ownership; discrete cost elements (e.g., Unit Production Cost, Operating and Support Cost) shall be translated into 'Design to' requirements. System development shall be continuously evaluated against these requirements with the same rigor as that applied to technical requirements. Practical tradeoffs shall be made between system capability, cost and schedule."

KEY POINTS

1. **"Design-to" Acquisition Costs.**
2. **"Design-to" Ownership Costs.**
3. **Tradeoffs Between Capability, Cost, and Schedule.**

In Design to Cost we must still achieve acceptable military

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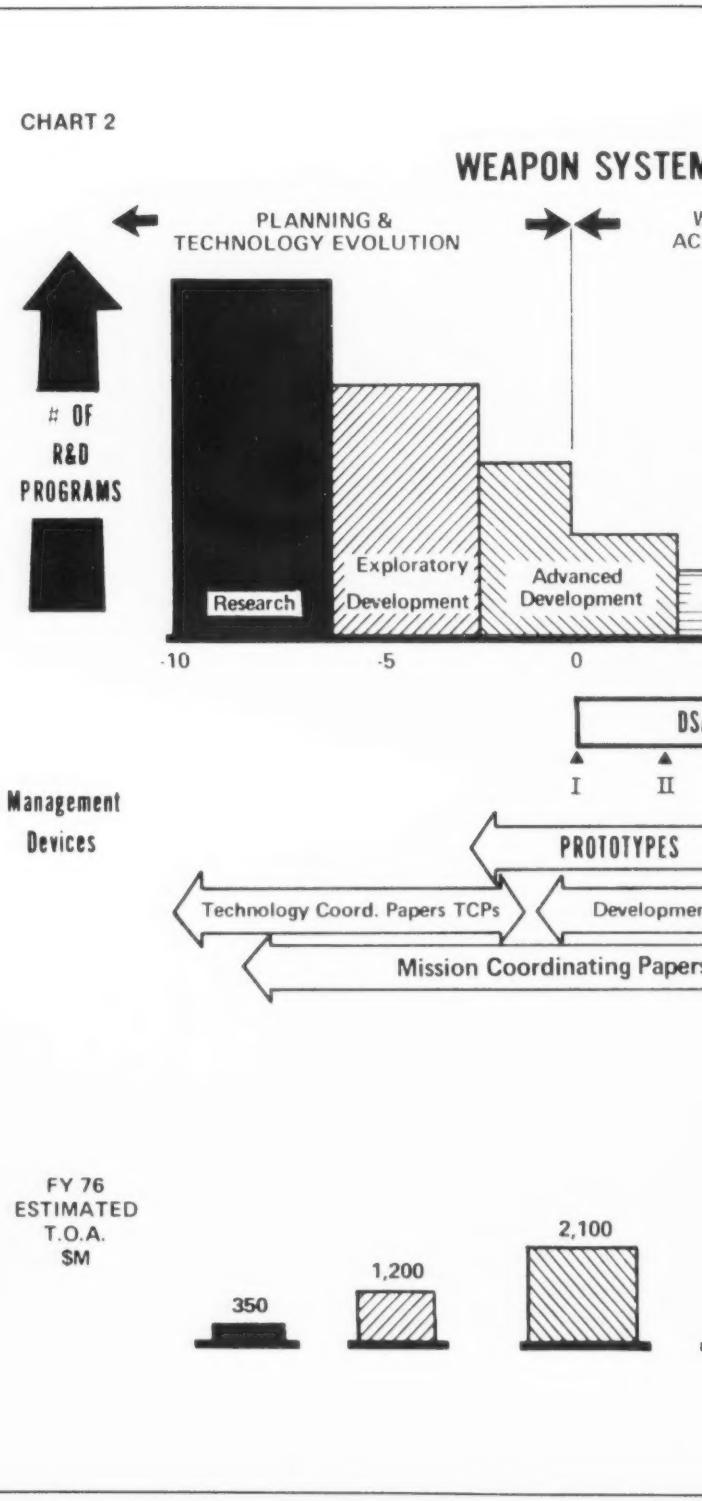

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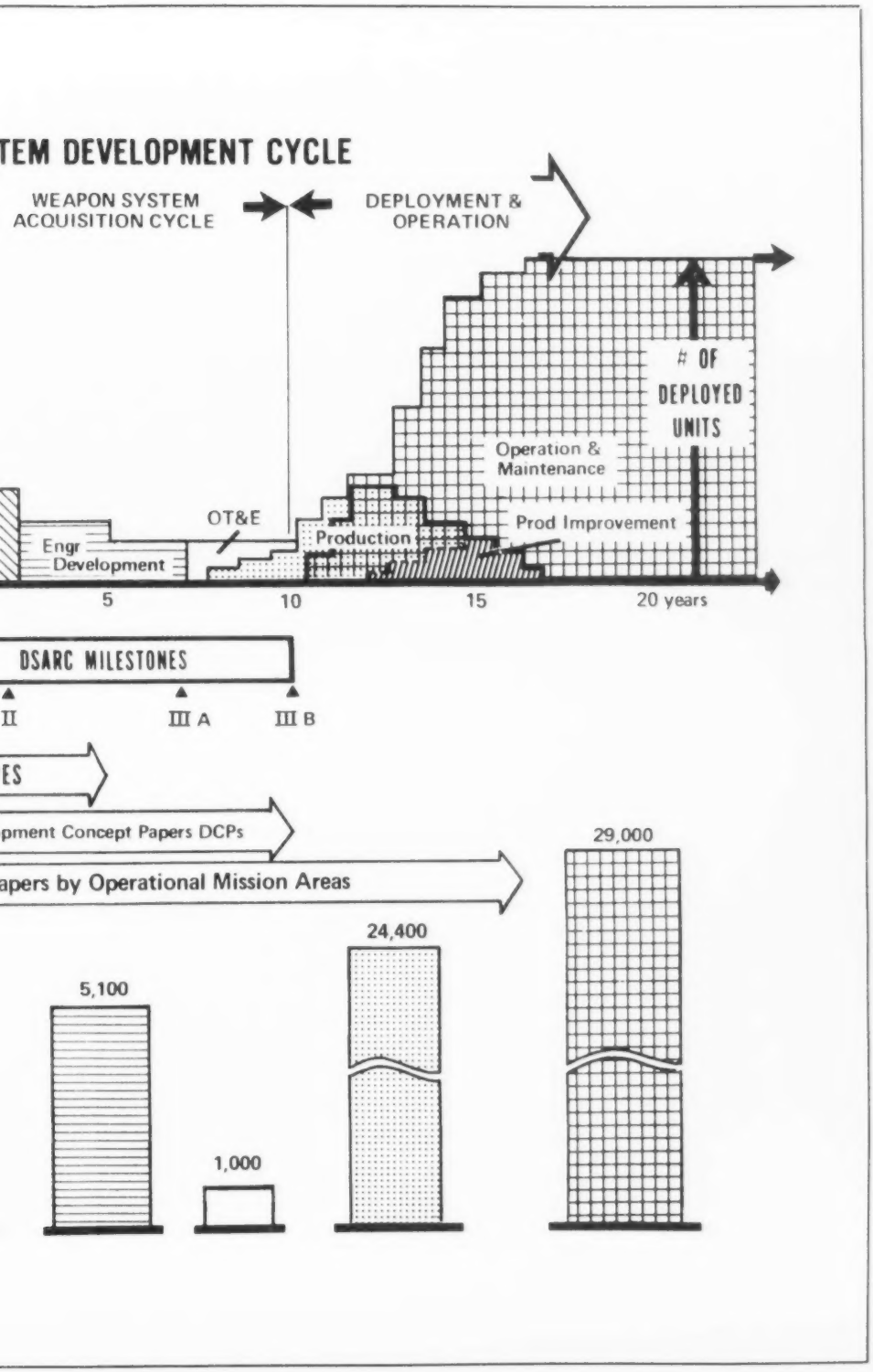

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performance. Competition can help attain this objective. The competitors know what cost we can afford to pay in production, and thus try to give us the best performance for that cost; this is in contrast to the prior form of competition where we fixed performance levels and were forced to accept an expensive design, even from the lowest bidder. But we must always be careful under Design to Cost that we do not accept lower performance than needed in the military mission.

The largest single area of cost in the weapon systems cycle is operations and support. This area is also growing rapidly for several reasons. First, it is manpower intensive, and manpower costs are rising significantly. Second, equipment continues to grow in complexity and sophistication and is therefore generally more expensive to operate and maintain. Finally, much of the equipment in the field is old, less reliable, and wearing out, and thus requires greater maintenance. Chart 5 shows a number of approaches we are taking to address this area. First, in each new weapon system development, we are striving to *design-in* improved reliability and maintainability. This must be done early in the design phase. We review this during the DSARC and during the Test and Evaluation cycle.

CHART 5

REDUCING SUPPORT COSTS

- *Thresholds on O&S Cost Drivers—Reliability and Maintainability.*
- *Support Cost Visibility Task Force.*
- *Emphasis on O&S Cost Estimating.*
- *Detailed OSD Review of Selected Major Systems.*
- *Reliability Improvement Warranties.*
- *Upgrading of Current Inventory.*
- *Improved Maintenance and Training Aids.*

Secondly, to better attack support costs, we must have far greater visibility of support costs—both direct and indirect—attributable to each weapon system and subsystem. To gain this visibility we have established a task force under the Comptroller's leadership to gather data on existing systems in the field. This data will be used in the design of new systems and to determine which current weapon systems need product improvement. This requires additional investment, but this will be more than paid back in a short time period out of maintenance cost savings. We are initiating independent cost estimates for the operations and support costs of new systems and are giving far greater attention to such costs in our source selections, contracts, incentives, etc.

Next, we are attempting to give the contractor greater responsibility for the field reliability of his equipment through use of "reliability improvement warranties". This will encourage him to design the equipment to be more reliable. The concept is similar to a commercial warranty, which holds the supplier responsible for the reliability of his equipment after it goes into the field. This concept is now being tried on a number of electronics subsystems in each of the Services.

Finally, there are a number of new technology concepts from the educational field which may be helpful in reducing maintenance and training costs. We are pursuing this opportunity vigorously to determine what savings can be made.

Chart 6 addresses the new initiatives we are taking in the field of standardization. Historically, this area has been more oriented to the supply category than to the weapon systems acquisition. For this reason, we have taken a number of major steps in recent years to take advantage of the obvious potential savings that result from standardization, i.e., lower development costs, larger quantity buys, less training on different systems, and less logistic support. We have established a new Specifications and Standards Board for the Defense Department, which I chair, and with flag and general officers from each of the Services and the Defense Supply Agency. It is authorized to act in the interests of standardization for the Secretary of Defense. This board has established a number of working panels and has already begun implementation of a number of new standards.

CHART 6

STANDARDIZATION —NEW INITIATIVES

- *Specs and Standards Board.*
- *Defense Science Board Study.*
- *Subsystem Standardization.*
- *NATO.*
- *Metrication.*

Secondly, we have established a new task force under the Defense Science Board made up of industry and military executives to address the question of how to improve on the application and/or elimination of many of our military specifications and standards. We believe these may be a source of unnecessary costs. We may have to change our basic way of doing business to permit greater flexibility in their use.

Next, we are trying to achieve far greater standardization of subsystems. Picking the airborne radio as an example; in the last two decades, we have practically designed a new radio for each airplane. This was consistent with the concept of, first, total package procurement and later strong weapon systems management offices. This produced the best, and perhaps the lowest cost, radio for each individual aircraft, but it did *not* result in the lowest cost for radios across the total DoD; since we built only 100 or so of each type, rather than a few thousand of only one type. We are now developing and procuring a single radio that will be applied in the future to all aircraft. This example is being duplicated in many other subsystems areas, and we are expanding the concept as widely as possible.

The concept of standardization can be applied multi-nationally, but it will face many political and cultural problems. Nonetheless, it offers very significant potential cost savings when properly applied. The SHORAD missile system program is an example of our use of a foreign development. The procurement of our Hawk missile system by our allies is an example in the opposite direction. This exchange, for the sake of standardization and its cost savings benefits, must be more aggressively pursued. One step in this direction is to encourage far greater use of the metric system within our defense procurements. It is important that the DoD not be behind the rest of American industry in converting to the metric system or this will end up costing us money—we have established a Metrication Panel under the Standards Board to insure appropriate DoD conversion.

Chart 7 depicts additional initiatives to reduce production costs. Numerous

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- *Greater Contractor Motivation for Capital Investment.*
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- *Low Level Initial Production.*

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Because of the need to better control production costs, the Services are placing increased emphasis on production management. This involves added training, increased skill levels, and more timely involvement of production people in the development of new weapon systems.

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Lastly, we find that we can save a significant amount of money by going slowly into production, rather than leaping into the optimum production rate immediately. This is the way the commercial world does their transition into production. It allows a time for a final production design and field testing of production equipment prior to commitment to the high production rates. It means we get the equipment into the forces somewhat later, and we suffer the increased cost of inflation,

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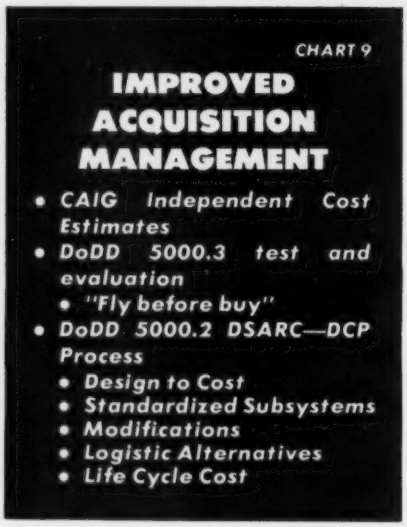
who was full to capacity with commercial business. Similarly, on a Navy electronics program, nine subcontractors have gone out of business over the past year. Many of these were sole source suppliers. I could, of course, expand this list. Suffice it to say that our industrial base is shrinking to dangerous levels.

Complicating this problem is the fact that we have, over the past 20 years, and as recently as the October '73 war in the Middle East, been occasionally required to increase our production capability while not impacting the civil sector. To solve these problems clearly requires improved industrial preparedness planning by both ourselves and our industrial contractors. Our industrial base is a major part of our defense deterrent. It must not be allowed to shrink to a point at which we cannot rapidly satisfy military needs. But there is a cost for this preparedness "insurance policy." Maintaining a broader base may not appear to be the most efficient way to do business. We feel, however, that the advantages of competition, and the necessity for industrial preparedness for potential defense needs, more than compensate.

Now, let me briefly discuss the pros and cons of Foreign Military Sales as they affect our industrial base. Very clearly, this area is becoming a significant factor in our industrial planning. This year, the U.S. Army's foreign military sales will exceed its own procurements. Foreign military sales at a level of $8-10 billion per year (including direct commercial sales) are certainly a major factor, relative to our total procurement budget. Through the use of these sales, we are able to broaden our industrial base and keep production lines open longer than we could otherwise. However, when the sales become such a significant percentage of our total procurements, as they are now, we must be careful to not have them "drive" our programs, nor to dilute our efforts in any way. We must also be careful, in the case of co-production programs, that we do not export critical manufacturing technology and manpower to the detriment of our industrial base. We, of course, balance these pros and cons during our reviews of Foreign Military Sales programs.

Lastly, and most important, is the subject of improving our acquisition management. Chart 9 summarizes several of the key steps recently taken.



First, to get a clear picture of the anticipated cost of our equipment, we have established independent cost estimating groups, both within the OSD and within the Services. These groups independently analyze projected production and support costs, as well as development costs, at each critical decision point in a weapon system's evolution.

Secondly, to reduce the very costly practice of concurrency, we have strengthened the independent test and evaluation function within the OSD and Services. "Fly before buy" is intended to assure that we do not take the next step in the development or production of a weapon system without assuring that our risks have been minimized and that concurrency is, wherever practical, eliminated.

Lastly, we have recently taken a major step forward in strengthening and defining the DSARC process. In this process each major weapon system is reviewed at each of its critical milestones prior to decisions affecting its next phase. These reviews, combined with the annual budget reviews, serve to assure high management visibility into our weapon system developments. The issuance of a new DoD Directive (5000.2) specifically requires that the principles delineated are all addressed at each DSARC milestone by each program manager. Such concepts as: design-to-cost, standardized subsystems, life cycle cost, logistics alternatives, etc., must all receive explicit attention throughout the acquisition cycle.

This new directive also increases the attention which the DoD gives to modifications of an existing system. Each new weapon system must be more fully justified in comparison with the lower risk, lower cost alternative of modifying current equipment; and, when the modification path is selected, those programs of significant dollar value will receive the same management attention given new major weapons systems.

In closing, let me return to the figure shown in Chart 2. It is clear that with limited resources, if we are to buy the quantities of equipment required in the future for a credible defense posture, we must minimize the production and support costs of each system. We believe the way to do this is to give greater consideration to *designing* lower production and support costs into the system during its development. Thus we use advanced technology to not only improve higher performance, but to lower cost and increase reliability as well. This is the challenge which we are posing to the design engineers. We are finding they are capable of meeting this challenge when properly motivated. It takes time to make a "cultural change", and it takes time to develop weapons systems. The effects of these management initiatives will not, therefore, be seen immediately. But they are starting to have an affect in DoD's weapons systems acquisition process. We are confident that you will begin to see the effects of them in FY 76 and even more so in future years.

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who was full to capacity with commercial business. Similarly, on a Navy electronics program, nine subcontractors have gone out of business over the past year. Many of these were sole source suppliers. I could, of course, expand this list. Suffice it to say that our industrial base is shrinking to dangerous levels.

Complicating this problem is the fact that we have, over the past 20 years, and as recently as the October '73 war in the Middle East, been occasionally required to increase our production capability while not impacting the civil sector. To solve these problems clearly requires improved industrial preparedness planning by both ourselves and our industrial contractors. Our industrial base is a major part of our defense deterrent. It must not be allowed to shrink to a point at which we cannot rapidly satisfy military needs. But there is a cost for this preparedness "insurance policy." Maintaining a broader base may not appear to be the most efficient way to do business. We feel, however, that the advantages of competition, and the necessity for industrial preparedness for potential defense needs, more than compensate.

Now, let me briefly discuss the pros and cons of Foreign Military Sales as they affect our industrial base. Very clearly, this area is becoming a significant factor in our industrial planning. This year, the U.S. Army's foreign military sales will exceed its own procurements. Foreign military sales at a level of $8-10 billion per year (including direct commercial sales) are certainly a major factor, relative to our total procurement budget. Through the use of these sales, we are able to broaden our industrial base and keep production lines open longer than we could otherwise. However, when the sales become such a significant percentage of our total procurements, as they are now, we must be careful to not have them "drive" our programs, nor to dilute our efforts in any way. We must also be careful, in the case of co-production programs, that we do not export critical manufacturing technology and manpower to the detriment of our industrial base. We, of course, balance these pros and cons during our reviews of Foreign Military Sales programs.

Lastly, and most important, is the subject of improving our acquisition management. Chart 9 summarizes several of the key steps recently taken.

CHART 9

IMPROVED ACQUISITION MANAGEMENT

- CAIG Independent Cost Estimates
- DoDD 5000.3 test and evaluation
  - "Fly before buy"
- DoDD 5000.2 DSARC—DCP Process
  - Design to Cost
  - Standardized Subsystems
  - Modifications
  - Logistic Alternatives
  - Life Cycle Cost

First, to get a clear picture of the anticipated cost of our equipment, we have established independent cost estimating groups, both within the OSD and within the Services. These groups independently analyze projected production and support costs, as well as development costs, at each critical decision point in a weapon system's evolution.

Secondly, to reduce the very costly practice of concurrency, we have strengthened the independent test and evaluation function within the OSD and Services. "Fly before buy" is intended to assure that we do not take the next step in the development or production of a weapon system without assuring that our risks have been minimized and that concurrency is, wherever practical, eliminated.

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